

Abstract

A series of papers was devoted to the investigation of third order ordinary differential equations of P-type. The interest in such problems is due to their applications in physics, chemistry, etc. In the year 2007, Conte et al. in the paper entitled "Painlevé structure of a multiion electrodiffusion system" showed that the coupled nonlinear system descriptive of multi-ion electrodiffusion of the first order corresponds to a nonlinear ordinary differential equation of P-type (solutions of such equations have no movable critical singular points). We understand that the solutions of this problem are not completely known; a topic addressed in the present paper. Some new third order rational ordinary differential equations with integer indices of Fuchs as well as recent ones are found